UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/066,463	01/31/2002	Hideaki Kurihara	FUJO 19.398	2188

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EXAMINER
LERNER, MARTIN

ART UNIT	PAPER NUMBER
2654	

DATE MAILED: 07/29/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 07-01)

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on <u>25 June 2003</u> .

2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) <u>2 to 4, 6 to 8, and 10 to 12</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) <u>2 to 4, 6 to 8, and 10 to 12</u> is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.

    If approved, corrected drawings are required in reply to this Office action.

12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☐ All b) ☐ Some * c) ☐ None of:

        1. ☐ Certified copies of the priority documents have been received.

        2. ☐ Certified copies of the priority documents have been received in Application No. _____ .

        3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage
application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

    a) ☐ The translation of the foreign language provisional application has been received.

15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)   4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)   5) ☐ Notice of Informal Patent Application (PTO-152)

3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .   6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 103

1.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2.   Claims 2, 3, 6, 7, 10, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Lee et al. ("A Study on a Reduction of the Transmission Bit Rate by U/V Decision Using LSP in the CELP Vocoder")* in view of *Gersho et al. ("An Overview of Variable Rate Speech Coding for Cellular Networks")*.

Regarding independent claims 2, 6, and 10, *Lee et al.* discloses a CELP vocoder device, method, and computer program, comprising:

"an LSP coefficient calculating unit calculating an LSP coefficient obtained from the voice signal" – line spectral pairs (LSPs) are calculated by LPC analysis of speech signal S (Pages 997, Right Column to Page 998, Right Column, II: Calculation of the LSP); Figure 4 shows a flowchart of the process includes a step called Extraction of LSP parameters (Page 999, Right Column: Figure 4);

"an LSP interval judging unit judging whether an interval on a frequency axis between the LSP coefficients is equal to or less than a prescribed threshold" – *int v(i)* is the LSP interval, where *int $v(i) = | p_{i+1} - p_i |$*, for a vector of LSPs $P = [p_1, p_2, \ldots, p_{10}]$

(Page 999, Right Column: Equation (18)); a test is made to determine whether min *int*

v(i), the minimum interval between line spectral pairs in an LSP interval vector *int v(i)*, is

less than $F_s/4$, where $F_s/4$ is the threshold ("equal to or less than a prescribed

threshold"); Figure 4 shows a flowchart of the process includes a step determining

whether min *int v(i)* < $F_s/4$ (Page 999, Right Column: Figure 4); LSPs [$p_1, p_2, \ldots, p_{10}$]

are points on a frequency axis, so *int v(i)* are intervals on a frequency axis;

"a judging unit judging whether a voice signal is a vowel when a voice part of a

voice signal is sounded" – to decide U/V, the NL and the NH value are detected; in the

case of NL is larger than NH, the speech spectrum is represented as a voiced speech

spectrum; thus, the frame is decided to be voiced speech; in the other case of NH is

larger than NL, the frame is decided to be unvoiced speech; that is, the unvoiced

speech has formants in a high frequency band; however, some vowels' NH is larger

than NL because vowels such as /i/, /ı/, /ɛ/, /æ/ have high second, third, and fourth

formants; such frames are decided by the existence of the first formant; if the LSP

intervals are detected and are narrow, the frame is decided to be voiced sounds (Page

999, Right Column: Figure 4); thus, LSP intervals are employed to make special

arrangements for some vowels by considering whether *int v(i)* < $F_s/4$ and a < b so the

frame can be correctly classified as voiced; Figure 4 shows a flowchart of the process

includes steps determining whether *int v(i)* < $F_s/4$ and a < b for these vowels (Page

999, Right Column: Figure 4).

Lee et al. discloses reduction of a transmission bit rate by U/V decision using

LSP parameters when testing for some vowels. (Page 1000: Table 1) An overall bit

rate can be reduced because unvoiced portions can be encoded with 32 bits. However, *Lee et al.* does not specifically disclose a rate setting unit setting a voice encoding bit rate to a lower bit rate when a vowel is present. That is, *Lee et al.* omits "a rate setting unit setting a voice encoding bit rate, if the voice signal is a vowel said voice encoding bit rate is set to a bit rate lower than the bit rate usually used when the voice part is sounded." Still, variable rate speech coding is fairly well known for reducing an overall bit rate by encoding voiced and unvoiced sounds with different encoding algorithms. *Gersho et al.* teaches voice activity controlled variable rate coding, and particularly a Phonetically Segmented VXC, where each coding frame is analyzed to determine a set of features that are then used to phonetically classify the frame. A variable coding rate is set for different phonetic segments. Bits can also be saved in encoding sustained vowels sounds. (Page 174, Left Column) Thus, *Gersho et al.* suggests variable rate speech coding for phonetic segments including certain vowels in order to reduce the overall bit rate. It would have been obvious to one having ordinary skill in the art to include a rate setting unit setting a voice encoding bit rate to a lower bit rate when certain vowels are detected as taught by *Gersho et al.* in the LSP CELP vocoder of *Lee et al.* for the purpose of reducing the overall bit rate by changing the encoding algorithm for certain vowels.

Regarding claims 3, 7, and 11, *Gersho et al.* teaches a variable coding rate is set for different phonetic segments, where bits can also be saved in encoding sustained vowels sounds (Page 174, Left Column); a "sustained vowel" presumes parameters of

the speech signal (i.e. LSPs) for the vowel do not move and are constant for a given time period; also, *Gersho et al.* teaches switching between various rates based on whether a short-term quality measure remains constant as a function of time (Page 174, Left Column, First Full Paragraph, citing Lundheim and Ramstad).

3.   Claims 4, 8, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Lee et al.* in view of *Gersho et al.* as applied to claims 2, 6, and 10 above, and further in view of *Kang et al.*

        Neither *Lee et al.* nor *Gersho et al.* disclose using templates to determine whether a speech segment is a vowel, although templates are well known for identifying the phonetic content of a speech segment by comparing speech segment parameters to parameters representing a class of phonetic features stored in the template. *Kang et al.* teaches a voice communication processing system, where a filter coefficient table contains line spectrum pair (LSP) sets, and particularly filter coefficient templates representing vowels by line spectral frequencies. It is suggested representing speech parameters by LSP-based templates has the advantage of reducing the bit rate. (Column 5, Line 67 to Column 7, Line 50, and particularly Column 6, Line 66 to Column 7, Line 50) It would have been obvious to one having ordinary skill in the art to determine whether a speech segment is a vowel by comparing to templates of LSP coefficients as taught by *Kang et al.* in the LSP CELP vocoder of *Lee et al.* for the purpose of reducing a bit rate.

Response to Arguments

4.   Applicants' arguments filed 27 May 2003 have been considered but are moot in view of the new grounds of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Martin Lerner whose telephone number is (703) 308-9064. The examiner can normally be reached on 8:30 AM to 6:00 PM Monday to Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil can be reached on (703) 305-9645. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9314 for regular communications and (703) 872-9315 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4700.

Richemond Dorvil
Primary Examiner

ml
July 17, 2003